EPA United States Environmental Protection Agency

# RESEARCH PROJECT

**National Risk Management Research Laboratory**
**Water Supply and Water Resources Division**
**Urban Watershed Management Branch**

# Design/Construction of a Permeable Pavement Demonstration Site at the Edison Environmental Center (EEC)

## IMPACT STATEMENT

This project will provide a scientifically defensible estimate of the performance of the three permeable surfaces: porous concrete, porous asphalt, and interlocking concrete pavers. The U.S. Environmental Protection Agency (EPA) can provide the results to municipalities enabling them to plan sound stormwater management strategies.

## BACKGROUND:

At present, there is little information on the performance of this stormwater management practice that practitioners can use to design a stormwater management plan. There is also little information of temporal changes or maintenance practices. This project is being conducted to generate reliable data on the stormwater management control. The Water Supply and Water Resources Division of EPA's Office of Research and Development's (ORD's) National Risk Management Research Laboratory (NRMRL) solicited advice and opinions from each trade group associated with the permeable surface installed to assure that the design and construction meet the associations' specifications.

## DESCRIPTION:

ORD's NRMRL has funded this research project in support of its Aging Water Infrastructure (AWI) Research Program. This project will measure the water quality parameters for at least ten years to establish the performance changes associated with seasonal patterns and with elapsed time (facility use). This allows measurements of changes in performance with maintenance practices, and also allows measurement of temperature profiles under each surface to detect heat island patterns. The project will establish the observational data on ancillary parameters such as the ability to plow snow, and the use of deicing chemicals.

Parking lot highlights:

- The lot covers about one acre and provides parking for employees and visitors.
- Driving lanes are paved with conventional asphalt that drains to the porous surfaces.
- The lot slopes so water flows across the driving lanes between the porous sections.
- Partially buried tanks receive water drained from lined sections of the permeable parking lanes, allowing researchers to measure volume and flow rates and also study stormwater quality.
- Monitoring instruments are installed in and beneath the porous pavement to understand the movement of stormwater through the pavement, underlying layers, and into the native soil.
- Six rain garden cells will help reduce stormwater runoff from non-porous sections of the parking lot and the roof of the adjacent building.

This parking lot, which was open for use on October 28, 2009, will not only function as a research site, it will also serve as a highly used parking lot for Edison Environmental Center staff and visitors. In addition, the lot will serve as a demonstration site for other federal facilities and will be used as a public outreach tool displaying green stormwater management.

EPA GOAL: Goal #2 - *Clean & Safe Water*; Objective 2.1.1- *Water Safe to Drink*
ORD MULTI YEAR PLAN: Water Quality (WQ), Long Term Goal - WQ-3 *Source Control*

RESEARCH PARTNERS:
*Contractors:* PARS Environmental Services; Compete Technical Solutions with S&E Services
*Collaborators:* EPA's Region 2 and Office of Administration and Resources Management

## EXPECTED OUTCOMES AND IMPACTS

This research project aims to provide sound methods for measuring the performance of similar stormwater controls installed in less controlled environments that can be executed by others. The project also provides statistically defensible performance results. Measurements will enable scientists to determine whether permeable surfaces will help cities:

- cool more effectively during summer evenings than areas paved with conventional surfaces;
- reduce stormwater volume flowing to receiving waters; and
- improve water quality by removing solids and other environmental contaminants.

All of the rain falling on the parking lot will infiltrate into the soil with no runoff reducing the environmental footprint of this EPA facility.

## OUTPUTS:

Current and expected outputs consist of reports, presentations, and a peer-reviewed journal article.

## RESOURCES:

Aging Water Infrastructure Research Program: http://www.epa.gov/awi/
NRMRL Urban Watershed Management Research: http://www.epa.gov/ednnrmrl/
Demonstration of parking lot's porous concrete: Video (WMV) (3.8 MB)

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